CLAIMS

1. Expandable vinylaromatic polymers which comprise:

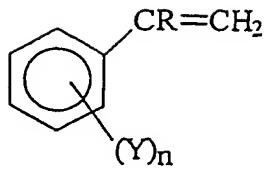
a) a matrix obtained by polymerizing 50-100% by weight of one or more vinylaromatic monomers and 0-50% by weight of a copolymerizable monomer;

b) 1-10% by weight, calculated with respect to the polymer (a), of an expanding agent englobed in the polymeric matrix;

c) 0.01-20% by weight, calculated with respect to the polymer (a), of carbon black homogeneously distributed in the polymeric matrix having an average diameter ranging from 30 to 2000 nm, a surface area ranging from 5 to 40 m^2/g, a sulfur content ranging from 0.1 to 2000 ppm and an ash content ranging from 0.001 to 1%.

2. The polymers according to claim 1, wherein the carbon black is characterized by a weight loss with heat ranging from 0.001 to 1%, an iodine number ranging from 0.001 to 20 g/kg and an absorption value of dibutylphthalate (DBPA) ranging from 5 to 100 ml/(100 g).

3. The polymers according to claim 1, wherein the vinylaromatic monomer is selected from those corresponding to the following general formula:



(I)

wherein R is a hydrogen or a methyl group, n is zero or an integer ranging from 1 to 5 and Y is a halogen, such as chlorine or bromine, or an alkyl or alkoxyl radical having from 1 to 4 carbon atoms.

4. The polymers according to claim 1, 2 or 3, wherein the vinylaromatic monomers having general formula (I) are used in a mixture, of up to 50% by weight, with other copolymerizable monomers selected from (meth)acrylic acid, C_1-C_4 alkyl esters of (meth)acrylic acid, amides and nitriles of (meth)acrylic acid, butadiene, ethylene, divinylbenzene, maleic anhydride.

5. The polymers according to claim 4, wherein the copoly merizable monomers are acrylonitrile and methylmethacrylate.

6. The polymers according to any of the previous claims, wherein the carbon black filler has an average diameter ranging from 100 to 1000 nm, a surface area ranging from 8 to 20 m^2/g, (measured according to ASTM D-6556), a sulfur content ranging from 1 to 500 ppm, an ash residue ranging from 0.01 to 0.3% (measured ac-

cording to ASTM D-1506), a weight loss with heat (measured according to ASTM D-1509) ranging from 0.01 to 0.5%, a DBPA (measured according to ASTM D-2414) of 20-80 ml/(100 g) and an iodine number (measured according to ASTM D-1510) ranging from 0.1 to 10 g/kg.

7. The polymers according to any of the previous claims, wherein the carbon black filler is used in a quantity ranging from 0.1 to 5% by weight, with respect to the polymer.

8. Expandable articles which can be obtained with the expandable vinylaromatic polymers according to any of the previous claims, having a density ranging from 5 to 50 g/l and a thermal conductivity ranging from 25 to 50 mW/mK, generally even over 10% lower than that of equivalent expanded materials without carbon black.

9. A process for the preparation of expandable vinylaromatic polymers which comprises polymerizing in aqueous suspension one or more vinylaromatic monomers, optionally together with at least one polymerizable comonomer in a quantity of up to 50% by weight, in the presence of a carbon black having an average diameter ranging from 30 to 2000 nm, a surface area ranging from 5 to 40 m^2/g, a sulfur content ranging from 0.1 to 2000 ppm and an ash content ranging from 0.001 to 1%, and in the presence of a peroxide radicalic ini-

tiator, optionally containing at least one aromatic ring, and an expansion agent added before, during or at the end of the polymerization.

10. The process according to claim 9, wherein the carbon black is characterized by a weight loss with heat ranging from 0.001 to 1%, an iodine number ranging from 0.001 to 20 g/kg and a DBPA value ranging from 5 to 100 ml/(100 g).

11. The process according to claim 9 or 10, wherein the polymerization is carried out in the presence of suspending agents of both the organic and inorganic type.

12. The process according to claim 11, wherein the inorganic suspending agents are coadjuvated by anionic surface-active agents or sodium metadisulfite.

13. The process according to any of the claims from 9 to 12, wherein the polymerization in suspension is effected through a solution of vinylaromatic polymer in the monomer, or mixture of monomers, in which the concentration of polymer ranges from 1 to 30% by weight.

14. The process according to any of the claims from 9 to 13, wherein, at the end of the polymerization beads of polymer are obtained in a substantially spherical form, with an average diameter ranging from 0.2 to 2 mm inside which the carbon black filler is homogeneously dispersed.

15. The process according to any of the claims from 9 to 14, wherein the polymer beads obtained at the end of the polymerization are washed with non-ionic surface-active agents.

16. The process according to any of the claims from 9 to 15, wherein during the polymerization flame-retardant agents are added in a quantity ranging from 0.1 to 8% by weight, with respect to the weight of the resulting polymer.

17. The process according to any of the claims from 9 to 16, wherein the expansion agents are added during the polymerization phase and are selected from aliphatic or cycloaliphatic hydrocarbons containing from 3 to 6 carbon atoms; halogenated derivates of aliphatic hydrocarbons containing from 1 to 3 carbon atoms; carbon dioxide and water.

18. A process for preparing, in mass and in continuous, expandable vinylaromatic polymers which comprises the following steps in series:

i. feeding a vinylaromatic polymer, as described above, to an extruder, together with a carbon black filler, having an average diameter ranging from 30 to 2000 nm, a surface area ranging from 5 to 40 m^2/g, a sulfur content ranging from 0.1 to 2000 ppm and an ash residue ranging from 0.001 to 1%;

ii. heating the vinylaromatic polymer to a temperature higher than the relative melting point;

iii. injecting the expanding agent and possible additives such as flame-retardant agents, into the molten polymer before extrusion through a die; and

iv) forming expandable beads, through a die, in a substantially spherical form with an average diameter ranging from 0.2 to 2 mm.

19. The process according to claim 18, wherein the carbon black is characterized by a weight loss with heat ranging from 0.001 to 1%, an iodine number ranging from 0.001 to 20 g/kg and a DBPA value ranging from 5 to 100 ml/(100 g).

20. The process according to any of the claims from 9 to 19, wherein the expandable beads produced are pretreated using methods generally applied to beads produced with conventional processes which essentially consist in:

a) coating the beads with a liquid antistatic agent such as amines, tertiary ethoxylated alkylamines, ethylene oxide-propylene oxide copolymers;

b) applying the coating to the beads thus treated, said coating essentially consisting of a mixture of mono-, di- and tri-esters of glycerin with fatty acids and of metallic stearates such as zinc and/or magnesium

stearate.

21. The process according to any of the claims from 9 to 20, wherein the carbon black is also added to the coating together with the mixture of esters.